50JZ−A
Single Packaged Heat Pump System
with Puron (R−410A) Refrigerant
50 Hz, CE Nominal 7−14 kW (Sizes 24−48)

Carrier
turn to the experts

Installation Instructions

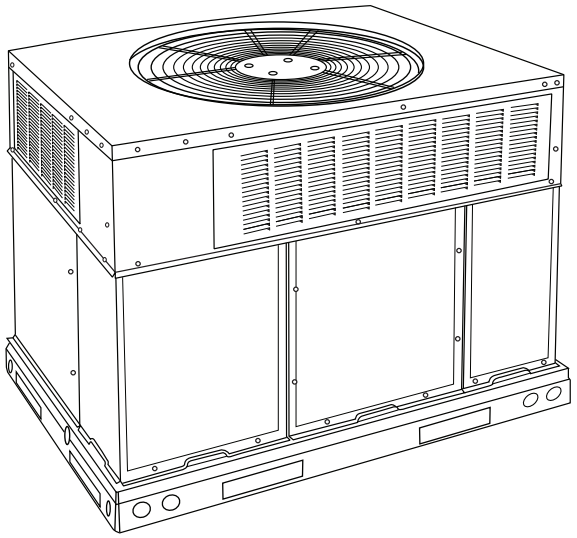
NOTE: Read the entire instruction manual before starting the installation.

NOTE: Installer: Make sure the Owner's Manual and Service Instructions are left with the unit after installation.

TABLE OF CONTENTS

PAGE

SAFETY CONSIDERATIONS 1
INTRODUCTION 2
RECEIVING AND INSTALLATION 2-9
Check Equipment 2
Identify Unit 2
Inspect Shipment 2
Provide Unit Support 2
Roof Curb 2
Slab Mount 2
Provide Clearances 2
Rig and Place Unit 6
Inspection 6
Rigging/Lifting of Unit 6
Select and Install Ductwork 6
Converting Horizontal Discharge Units to Downflow (Vertical) Discharge Units 7
Provide for Condensate Disposal 8
Install Electrical Connections 10
High-Voltage Connections 10
Control Voltage Connections 10
Standard Connections 10
Transformer Protection 10
Accessory Electric Heaters Installation 11
Sequence of Operation 11
PRE-START-UP 13
START-UP 13-16
Checking Cooling & Heating Control Operation 13
Check for Refrigerant Leaks 13
Start-Up Adjustments 14
Checking & Adjusting Refrigerant Charge 14
Indoor Airflow & Airflow Adjustments 15
Defrost Control 17
Quiet Shift 17
Defrost 17
MAINTENANCE 17-20
Air Filter 18
Indoor Blower and Motor 18
Outdoor Coil, Indoor Coil, & Condensate Drain Pan 19
Outdoor Fan 19
Electrical Controls and Wiring 19
Refrigerant Circuit 19
Indoor Airflow 19
Metering Devices- Piston 19
Pressure Switches 19
Loss of Charge Switch 19
High Pressure Switch 20
Copeland Scroll compressor (Puron Refrigerant) 20



A09042

Fig. 1 - Unit 50JZ-A

Refrigerant System 20
Refrigerant 20
Compressor Oil 20
Servicing Systems on Roofs with Synthetic Materials 20
Liquid Line Filter Drier 20
Puron® (R-410A) Refrigerant Charging 20
System Information 20
Loss of Charge Switch 20
Check Defrost Thermostat 20
TROUBLESHOOTING 21
START-UP CHECKLIST 21

SAFETY CONSIDERATIONS

Installation and servicing of this equipment can be hazardous due to mechanical and electrical components. Only trained and qualified personnel should install, repair, or service this equipment.

Untrained personnel can perform basic maintenance functions such as cleaning and replacing air filters. All other operations must be performed by trained service personnel. When working on this equipment, observe precautions in the literature, on tags, and on labels attached to or shipped with the unit and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Use quenching cloth for brazing operations. Have a fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes, the current editions of the National Electrical Code (NEC) NFPA 70. In Canada refer to the current editions of the Canadian Electrical Code CSA C22.1.

Recognize safety information. This is the safety-alert symbol ⚠. When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand these

signal words: DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **may** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Before installing or servicing system, always turn off main power to system and install lockout tag. There may be more than one disconnect switch. Turn off accessory heater power switch if applicable.

⚠ CAUTION

CUT HAZARD

Failure to follow this caution may result in personal injury.

When removing access panels (see Fig. 18) or performing maintenance functions inside your unit, be aware of sharp sheet metal parts and screws. Although special care is taken to reduce sharp edges to a minimum, be extremely careful when handling parts or reaching into the unit.

INTRODUCTION

The 50JZ-A heat pump is fully self-contained and designed for outdoor installation. (See Fig. 1) Standard units are shipped in a horizontal-discharge configuration for installation on a ground level slab. Standard units can be converted to downflow (vertical) discharge configurations for rooftop applications.

RECEIVING AND INSTALLATION

Step 1 — Check Equipment

Identify Unit

The unit model number and serial number are stamped on the unit identification plate. Check this information against shipping papers.

Inspect Shipment

Inspect for shipping damage before removing packaging material. If unit appears to be damaged or is torn loose from its anchorage, have it examined by transportation inspectors before removal. Forward claim papers directly to transportation company. Manufacturer is not responsible for any damage incurred in transit. Check all items against shipping list. Immediately notify the nearest equipment distributor if any item is missing. To prevent loss or damage, leave all parts in original packages until installation.

If the unit is to be mounted on a curb in a downflow application, review Step 5 to determine which method is to be used to remove the downflow panels before rigging and lifting into place. The panel removal process may require the unit to be on the ground.

Step 2 — Provide Unit Support

Roof Curb

Install accessory roof curb in accordance with instructions shipped with curb (See Fig. 5). Install insulation, cant strips, roofing, and flashing. Ductwork must be attached to curb.

IMPORTANT: The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasketing material supplied with the roof curb. Improperly applied gasketing also can result in air leaks and poor unit performance.

Curb should be level to within 1/4 in. (6 mm) (See Fig. 9). This is necessary for unit drain to function properly. Refer to accessory roof curb installation instructions for additional information as required.

Installation on older "G" series roof curbs.

Two accessory kits are available to aid in installing a new "G" series unit on an old "G" roof curb.

1. Accessory kit number CPADCURB001A00, (small chassis) and accessory kit number CPADCURB002A00, (large chassis) includes roof curb adapter and gaskets for the perimeter seal and duct openings. No additional modifications to the curb are required when using this kit.
2. An alternative to the adapter curb is to modify the existing curb by removing the outer horizontal flange and use accessory kit number CPGSKTKIT001A00 which includes spacer blocks (for easy alignment to existing curb) and gaskets for the perimeter seal and duct openings. This kit is used when existing curb is modified by removing outer horizontal flange.

⚠ CAUTION

UNIT/STRUCTURAL DAMAGE HAZARD

Failure to follow this caution may result in property damage.

Ensure there is sufficient clearance for saw blade when cutting the outer horizontal flange of the roof curb so there is no damage to the roof or flashing.

Slab Mount

Place the unit on a solid, level concrete pad that is a minimum of 4 in. (102 mm) thick with 2 in. (51 mm) above grade (See Fig. 2). The slab should extend approximately 2 in. (51 mm) beyond the casing on all 4 sides of the unit. Do not secure the unit to the slab except when required by local codes.

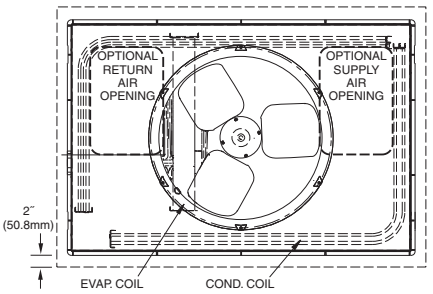


Fig. 2 - Slab Mounting Detail

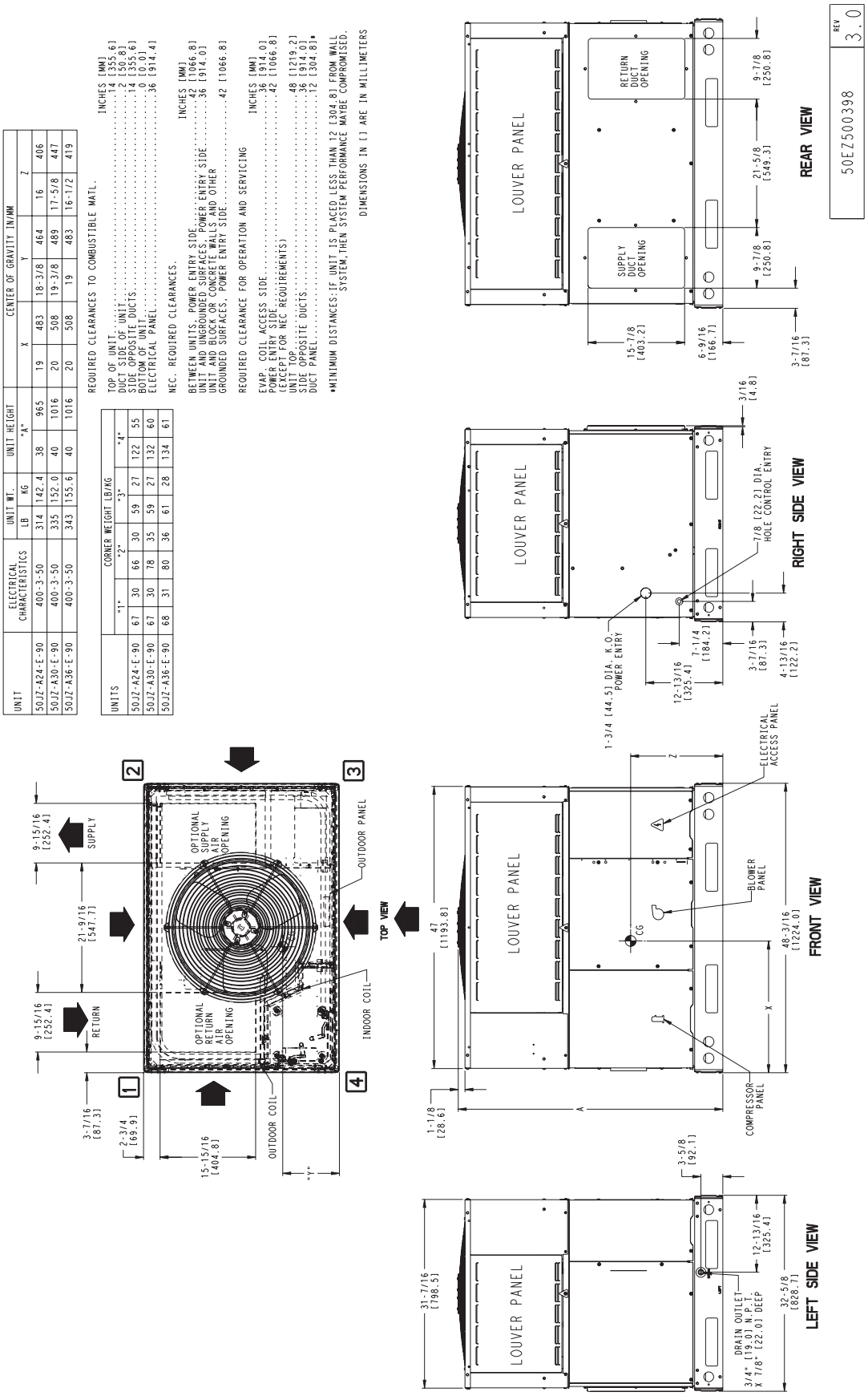
Step 3 — Provide Clearances

The required minimum service clearances are shown in Fig. 3 and 4. Adequate ventilation and outdoor air must be provided. The outdoor fan draws air through the outdoor coil and discharges it through the top fan grille. Be sure that the fan discharge does not recirculate to the outdoor coil. Do not locate the unit in either a corner or under an overhead obstruction. The minimum clearance under a partial overhang (such as a normal house overhang) is 48 in. (1219 mm) above the unit top. The maximum horizontal extension of a partial overhang must not exceed 48 in. (1219 mm).

IMPORTANT: Do not restrict outdoor airflow. An air restriction at either the outdoor-air inlet or the fan discharge may be detrimental to compressor life.

Do not place the unit where water, ice, or snow from an overhang or roof will damage or flood the unit. Do not install the unit on carpeting or other combustible materials. Slab-mounted units

should be at least 4 in. (102 mm) above the highest expected water and runoff levels. Do not use unit if it has been under water.



UNIT	ELECTRICAL CHARACTERISTICS	UNIT WT.		UNIT HEIGHT	CENTER OF GRAVITY IN/MM					
		LB	KG	"A"	X		Y		Z	
50JZ-A24-E-90	400-3-50	314	142.4	38	19	483	18-3/8	464	16	406
50JZ-A30-E-90	400-3-50	335	152.0	40	20	508	19-3/8	489	17-5/8	447
50JZ-A36-E-90	400-3-50	343	155.6	40	20	508	19	483	16-1/2	419

UNITS	CORNER WEIGHT LB/KG							
	"1"		"2"		"3"		"4"	
50JZ-A24-E-90	67	30	66	30	59	27	122	55
50JZ-A30-E-90	67	30	78	35	59	27	132	60
50JZ-A36-E-90	68	31	80	36	61	28	134	61

REQUIRED CLEARANCES TO COMBUSTIBLE MATL. INCHES [MM]

TOP OF UNIT	14 [355.6]
DUCT SIDE OF UNIT	2 [50.8]
SIDE OPPOSITE DUCTS	14 [355.6]
BOTTOM OF UNIT	0 [0.0]*
ELECTRICAL PANEL	36 [914.4]

NEC. REQUIRED CLEARANCES. INCHES [MM]

BETWEEN UNITS, POWER ENTRY SIDE	42 [1066.8]
UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE	36 [914.0]
UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE	42 [1066.8]

REQUIRED CLEARANCE FOR OPERATION AND SERVICING INCHES [MM]

EVAP. COIL ACCESS SIDE	36 [914.0]
POWER ENTRY SIDE	42 [1066.8]
(EXCEPT FOR NEC REQUIREMENTS)	
UNIT TOP	48 [1219.2]
SIDE OPPOSITE DUCTS	36 [914.0]
DUCT PANEL	12 [304.8]*

*MINIMUM DISTANCES: IF UNIT IS PLACED LESS THAN 12 [304.8] FROM WALL SYSTEM, THEN SYSTEM PERFORMANCE MAYBE COMPROMISED.

DIMENSIONS IN [] ARE IN MILLIMETERS

Fig. 3 - 50JZ-A24-36 Unit Dimensions

UNIT	ELECTRICAL CHARACTERISTICS	UNIT WT.		UNIT HEIGHT		CENTER OF GRAVITY IN/MM					
		LB	KG	"A"		X		Y		Z	
50JZ-A48-E-90	400-3-50	373	169.2	44	1118	20	508	21-3/8	540	18	457

UNITS	CORNER WEIGHT LB/KG							
	"1"		"2"		"3"		"4"	
50JZ-A48-E-90	81	37	56	25	100	45	136	62

REQUIRED CLEARANCES TO COMBUSTIBLE MATL.

	INCHES [MM]
TOP OF UNIT	14 [355.6]
DUCT SIDE OF UNIT	2 [50.8]
SIDE OPPOSITE DUCTS	14 [355.6]
BOTTOM OF UNIT	0 [0.0]
ELECTRICAL PANEL	36 [914.4]

NEC. REQUIRED CLEARANCES.

	INCHES [MM]
BETWEEN UNITS, POWER ENTRY SIDE	42 [1066.8]
UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE	36 [914.0]
UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE	42 [1066.8]

REQUIRED CLEARANCE FOR OPERATION AND SERVICING

	INCHES [MM]
EVAP. COIL ACCESS SIDE	36 [914.0]
POWER ENTRY SIDE	42 [1066.8]
(EXCEPT FOR NEC REQUIREMENTS)	
UNIT TOP	48 [1219.2]
SIDE OPPOSITE DUCTS	36 [914.0]
DUCT PANEL	12 [304.8]*

*MINIMUM DISTANCES: IF UNIT IS PLACED LESS THAN 12 [304.8] FROM WALL SYSTEM, THEN SYSTEM PERFORMANCE MAYBE COMPROMISED.

DIMENSIONS IN [] ARE IN MILLIMETERS

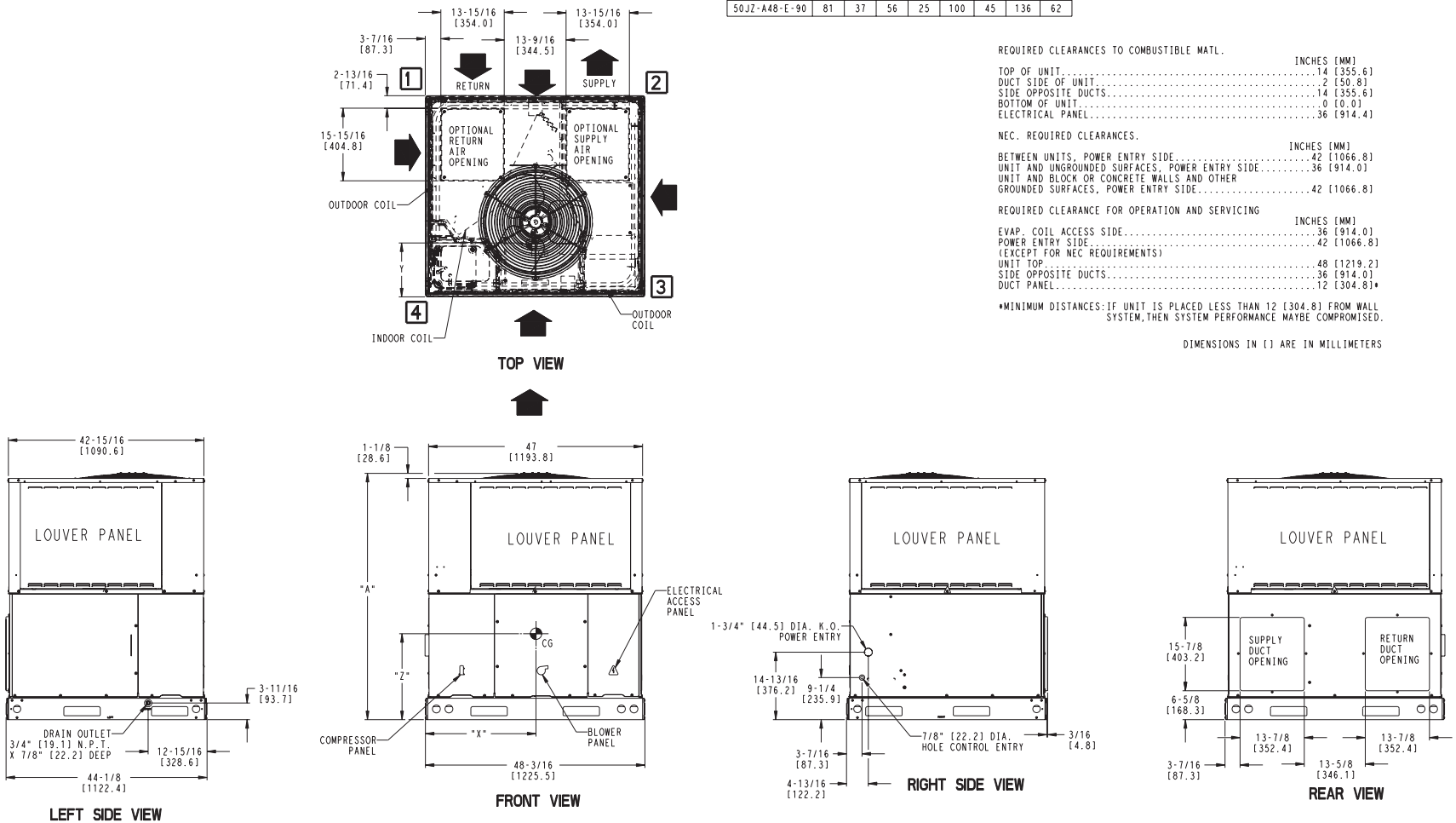
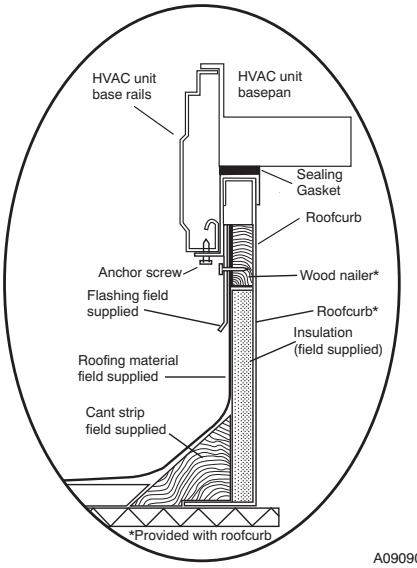
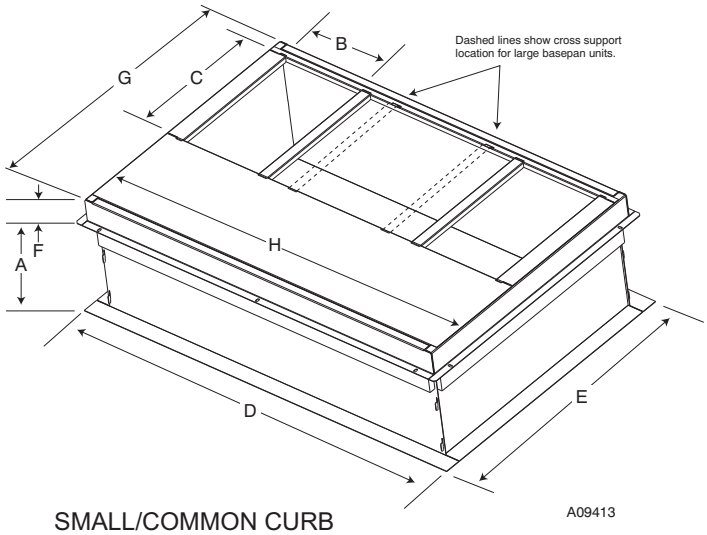


Fig. 4 - 50JZ-A48 Unit Dimensions

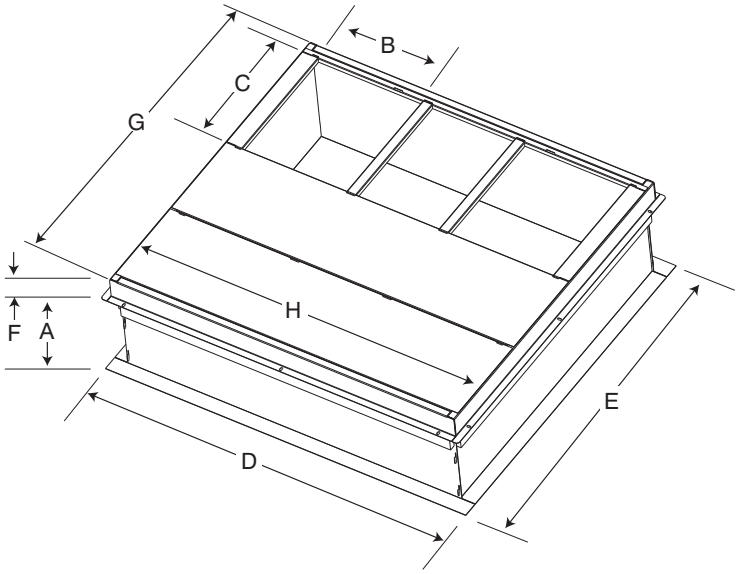
50EZ500399	REV 3.0



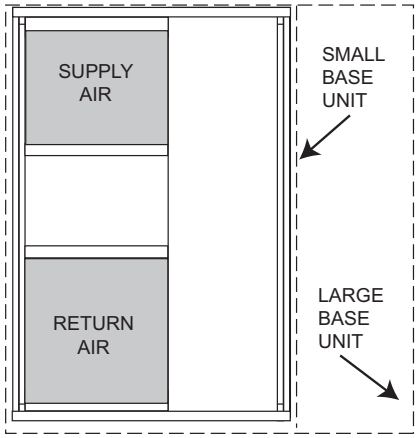
ROOF CURB DETAIL



SMALL/COMMON CURB



LARGE CURB



UNIT PLACEMENT ON COMMON CURB

SMALL OR LARGE BASE UNIT

A09414

UNIT SIZE	CATALOG NUMBER	A IN. (mm)	B (small/common base) IN. (mm)*	B (large base) IN. (mm)*	C IN. (mm)	D IN. (mm)	E IN. (mm)	F IN. (mm)	G IN. (mm)	H IN. (mm)
Small or Large	CPRFCURB010A00	11 (279)	10 (254)	14 (356)	16 (406)	47.8 (1214)	32.4 (822)	2.7 (69)	30.6 (778)	46.1 (1170)
	CPRFCURB011A00	14 (356)								
Large	CPRFCURB012A00	11 (279)	14 (356)				43.9 (1116)		42.2 (1072)	
	CPRFCURB013A00	14 (356)								

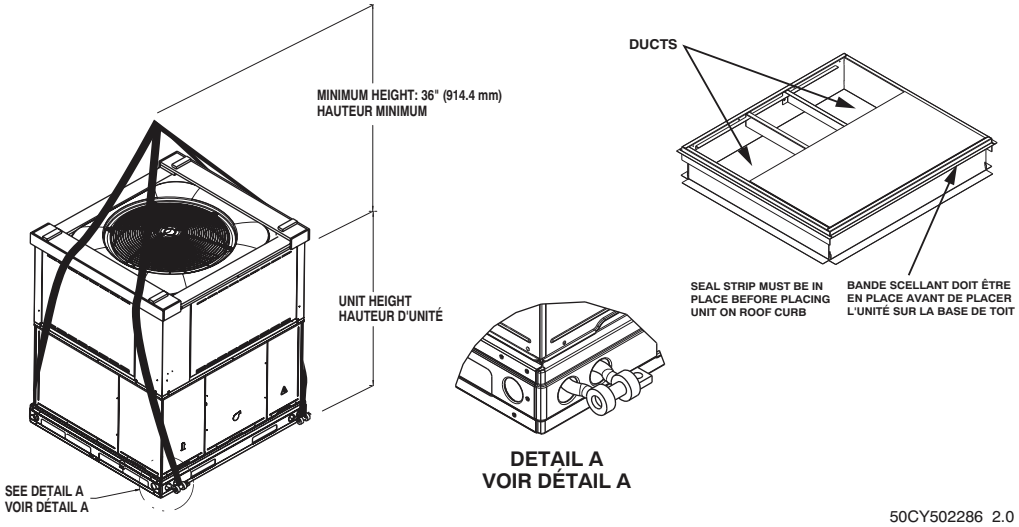
* Part Numbers CPRCURB010A00 and CPRCURB011A00 can be used on both small and large basepan units. The cross supports must be located based on whether the unit is a small basepan or a large basepan.

NOTES:

1. Roof curb must be set up for unit being installed.
2. Seal strip must be applied, as required, to unit being installed.
3. Roof curb is made of 16−gauge steel.
4. Attach ductwork to curb (flanges of duct rest on curb).
5. Insulated panels: 1−in. (25 mm) thick fiberglass 1 lb. density.

Fig. 5 - Roof Curb Dimensions

⚠ CAUTION - NOTICE TO RIGGERS
⚠ PRUDENCE - AVIS AUX MANIPULATEUR
ACCESS PANELS MUST BE IN PLACE WHEN RIGGING.
PANNEAUX D'ACCES DOIT ÊTRE EN PLACE POUR MANIPULATION.
Use top skid as spreader bar. / Utiliser la palette du haut comme barre de répartition


MINIMUM HEIGHT: 36" (914.4 mm)
HAUTEUR MINIMUM
UNIT HEIGHT
HAUTEUR D'UNITÉ
SEE DETAIL A
VOIR DÉTAIL A
DETAIL A
VOIR DÉTAIL A
DUCTS
SEAL STRIP MUST BE IN PLACE BEFORE PLACING UNIT ON ROOF CURB
BANDE SCELLANT DOIT ÊTRE EN PLACE AVANT DE PLACER L'UNITÉ SUR LA BASE DE TOIT
50CY502286 2.0

A09051

RIGGING WEIGHTS (SMALL CABINET)								RIGGING WEIGHTS (LARGE CABINET)		
Unit	24		30		36			Unit	48	
	lb	kg	lb	kg	lb	kg			lb	kg
Rigging Weight	314	142.4	335	152.0	343	155.6		Rigging Weight	373	169.2

NOTE: See dimensional drawing for corner weight distribution.

Fig. 6 - Rigging Weights

Step 4 — Rig and Place Unit

Rigging and handling of this equipment can be hazardous for many reasons due to the installation location (roofs, elevated structures, etc.).

Only trained, qualified crane operators and ground support staff should handle and install this equipment.

When working with this equipment, observe precautions in the literature, on tags, stickers, and labels attached to the equipment, and any other safety precautions that might apply.

Training for operators of the lifting equipment should include, but not be limited to, the following:

1. Application of the lifter to the load, and adjustment of the lifts to adapt to various sizes or kinds of loads.
2. Instruction in any special operation or precaution.
3. Condition of the load as it relates to operation of the lifting kit, such as balance, temperature, etc.

Follow all applicable safety codes. Wear safety shoes and work gloves.

Inspection

Prior to initial use, and at monthly intervals, all rigging shackles, clevis pins, and straps should be visually inspected for any damage, evidence of wear, structural deformation, or cracks. Particular attention should be paid to excessive wear at hoist hooking points and load support areas. Materials showing any kind of wear in these areas must not be used and should be discarded.

⚠ WARNING

UNIT FALLING HAZARD

Failure to follow this warning could result in personal injury or death.

Never stand beneath rigged units or lift over people.

1. Leave top shipping skid on the unit for use as a spreader bar to prevent the rigging straps from damaging the unit. If the skid is not available, use a spreader bar of sufficient length to protect the unit from damage.

⚠ WARNING

PROPERTY DAMAGE HAZARD

Failure to follow this warning could result in personal injury.

When straps are taut, the clevis should be a minimum of 36 in. (914 mm) above the unit top cover.

Rigging/Lifting of Unit (See Fig. 6)

Lifting holes are provided in base rails as shown.

1. Attach shackles, clevis pins, and straps to the base rails of the unit. Be sure materials are rated to hold the weight of the unit (See Fig. 6).
2. Attach a clevis of sufficient strength in the middle of the straps. Adjust the clevis location to ensure unit is lifted level with the ground.

After the unit is placed on the roof curb or mounting pad, remove the top skid.

Step 5 — Select and Install Ductwork

The design and installation of the duct system must be in accordance with the standards of the NFPA for installation of non-residence type air conditioning and ventilating systems, NFPA 90A or residence-type, NFPA 90B and/or local codes and ordinances.

Select and size ductwork, supply-air registers, and return air grilles according to ASHRAE (American Society of Heating, Refrigeration, and Air Conditioning Engineers) recommendations.

The unit has duct flanges on the supply- and return-air openings on the side of the unit.

⚠ WARNING

PERSONAL INJURY HAZARD

Failure to follow this warning could result in personal injury or death.

For vertical supply and return units, tools or parts could drop into ductwork Install a 90 degree turn in the return ductwork between the unit and the conditioned space. If a 90 degree elbow cannot be installed, then a grille of sufficient strength and density should be installed to prevent objects from falling into the conditioned space. Units with electric heaters require 90 degree elbow in supply duct.

When designing and installing ductwork, consider the following:

1. All units should have field-supplied filters or accessory filter rack installed in the return-air side of the unit. Recommended sizes for filters are shown in Table 1.
2. Avoid abrupt duct size increases and reductions. Abrupt change in duct size adversely affects air performance.

IMPORTANT: Use flexible connectors between ductwork and unit to prevent transmission of vibration. Use suitable gaskets to ensure weather tight and airtight seal. When electric heat is installed, use fireproof canvas (or similar heat resistant material) connector between ductwork and unit discharge connection. If flexible duct is used, insert a sheet metal sleeve inside duct. Heat resistant duct connector (or sheet metal sleeve) must extend 24-in. (610 mm) from electric heater element.

3. Size ductwork for cooling air quantity (cfm). The minimum air quantity for proper electric heater operation is listed in Table 2. Heater limit switches may trip at air quantities below those recommended.
4. Seal, insulate, and weatherproof all external ductwork. Seal, insulate and cover with a vapor barrier all ductwork passing through conditioned spaces. Follow latest Sheet Metal and Air Conditioning Contractors National Association (SMACNA) and Air Conditioning Contractors Association (ACCA) minimum installation standards for residential heating and air conditioning systems.
5. Secure all ducts to building structure. Flash, weatherproof, and vibration-isolate duct openings in wall or roof according to good construction practices.

CONFIGURING UNITS FOR DOWNFLOW (VERTICAL) DISCHARGE

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Before performing service or maintenance operations on the system, turn off main power to unit and install lockout tag.

1. Open all electrical disconnects and install lockout tag before starting any service work.
2. Remove horizontal (metal) ductcovers to access vertical (downflow) discharge duct knockouts in unit basepan. (See Fig. 7.)
3. To remove downflow return and supply knockout covers, break front and right side connecting tabs with a screwdriver and hammer. Push cover down to break rear and left side tabs.

NOTE: These panels are held in place with tabs similar to an electrical knockout. Reinstall horizontal duct covers (Fig. 7) shipped on unit from factory. Insure openings are air and watertight.

NOTE: The design and installation of the duct system must be in accordance with the standards of the NFPA for installation of nonresidence-type air conditioning and ventilating systems, NFPA 90A or residence-type, NFPA 90B; and/or local codes and ordinances.

Adhere to the following criteria when selecting, sizing, and installing the duct system:

1. Units are shipped for side shot installation.
2. Select and size ductwork, supply-air registers, and return-air grilles according to American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) recommendations.
3. Use flexible transition between rigid ductwork and unit to prevent transmission of vibration. The transition may be screwed or bolted to duct flanges. Use suitable gaskets to ensure weather-tight and airtight seal.
4. All units must have field-supplied filters or accessory filter rack installed in the return-air side of the unit. Recommended sizes for filters are shown in Table 1.
5. Size all ductwork for maximum required airflow (either heating or cooling) for unit being installed. Avoid abrupt duct size increases or decreases or performance may be affected.

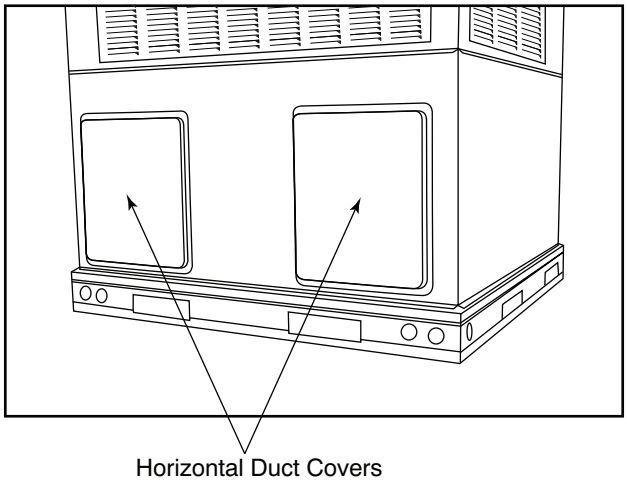


Fig. 7 - Supply and Return Duct Opening

6. Adequately insulate and weatherproof all ductwork located outdoors. Insulate ducts passing through unconditioned space, and use vapor barrier in accordance with latest issue of Sheet Metal and Air Conditioning Contractors National Association (SMACNA) and Air Conditioning Contractors of America (ACCA) minimum installation standards for heating and air conditioning systems. Secure all ducts to building structure.

7. Flash, weatherproof, and vibration-isolate all openings in building structure in accordance with local codes and good building practices.

Step 6 — Provide for Condensate Disposal

NOTE: Ensure that condensate-water disposal methods comply with local codes, restrictions, and practices.

The 50JZ-A units dispose of condensate through a 3/4 in. NPT female fitting that exits on the compressor end of the unit. Condensate water can be drained directly onto the roof in rooftop installations (where permitted) or onto a gravel apron in ground level installations. Install a field-supplied condensate trap at end of condensate connection to ensure proper drainage. Make sure that the outlet of the trap is at least 1 in. (25 mm) lower than the drain-pan condensate connection to prevent the pan from overflowing. Prime the trap with water. When using a gravel apron, make sure it slopes away from the unit.

If the installation requires draining the condensate water away from the unit, install a field-supplied 2 -in. (51mm) trap at the condensate connection to ensure proper drainage. Condensate trap is available as an accessory or is field-supplied. Make sure that the outlet of the trap is at least 1 in. (25 mm) lower than the unit drain-pan condensate connection to prevent the pan from overflowing. Connect a drain tube using a minimum of field-supplied 3/4-in. PVC or field-supplied 3/4-in. copper pipe at outlet end of the 2-in. (51 mm) trap. (See Fig. 8.) Do not undersize the tube. Pitch the drain tube downward at a slope of at least 1 in. (25 mm) every 10 ft (3 m) of horizontal run. Be sure to check the drain trough for leaks. Prime the trap at the beginning of the cooling season start-up.

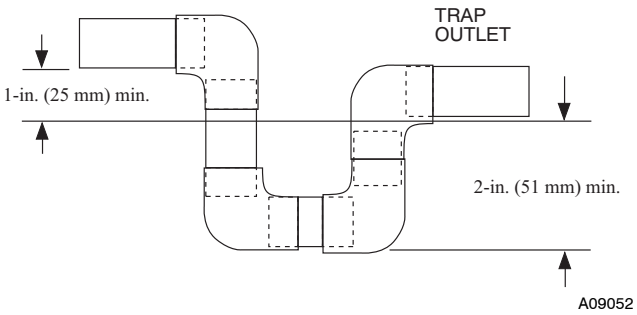
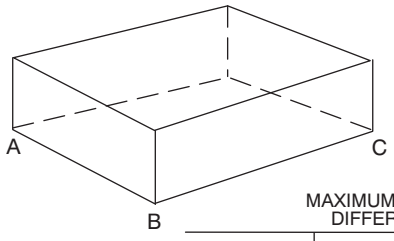


Fig. 8 - Condensate Trap



MAXIMUM ALLOWABLE DIFFERENCE in. (mm)

A-B	B-C	A-C
1/4 (6.35)	1/4 (6.35)	1/4 (6.35)

A07925

Fig. 9 - Unit Leveling Tolerances

Table 1 – Physical Data - Unit 50JZ-A

UNIT SIZE	50JZ–A24	50JZ–A30	50JZ–A36	50JZ–A48
NOMINAL CAPACITY (ton)	2	2.5	3	4
(kW)	7	8.8	10.6	14.1
OPERATING WEIGHT (lb)	314	335	343	373
(kg)	142.4	152.0	155.6	169.2
COMPRESSOR QUANTITY	1			
TYPE	SCROLL COMPRESSOR			
REFRIGERANT	R–410A			
METERING DEVICE ID	Accurater			
Refrigerant (R–410A) Quantity (lb)	6.9	9.6	10.0	12.0
Quantity (kg)	3.2	4.0	4.2	4.8
ORIFICE ID (in.)	0.059	0.061	0.067	0.078
(mm)	1.55	1.55	1.70	1.93
ORIFICE OD (in.)	0.032 (2)	0.040 (2)	0.040 (2)	0.046 (2)
(mm)	.81	1.02	1.02	1.17
OUTDOOR COIL				
Rows... Fins/in.	2...17	2...17	2...17	2...17
Rows... Fins (cm)	2...6.7	2...6.7	2...6.7	2...6.7
face area (sq. ft.)	8.5	10.3	10.3	13.5
face area (sq. m)	.79	.96	.96	1.25
OUTDOOR FAN				
Nominal Airflow (CFM)	2200	2200	2200	2400
Nominal Airflow (L/s)	1038	1038	1038	1133
Diameter (in)	22	22	22	22
Diameter (mm)	559	559	559	559
Motor HP (RPM)	1/4 (900)	1/4 (900)	1/4 (900)	1/3 (1340)
Motor kW	187	187	187	249
Motor (r/s)	.187...15	.187...15	.187...15	.249...22
INDOOR COIL				
Rows... Fins/in.	3...15	3...15	4...15	4...15
Rows... Fins (cm)	3...5.9	3...5.9	4...5.9	4...5.9
face area (sq. ft.)	3.7	3.7	3.7	4.7
face area (sq. m)	.34	.34	.34	.44
INDOOR BLOWER				
Nominal Cooling Airflow (CFM)	800	1000	1200	1600
Nominal Cooling Airflow (L/s)	378	472	566	708
Size (in.)	10x10	10x10	10x10	11x10
Size (cm)	25.4x25.4	25.4x25.4	25.4x25.4	27.9x25.4
Motor (HP)	1/4	1/2	1/2	1.0
Motor (kW)	187	373	373	746
HIGH–PRESSURE SWITCH (psig)				
Cutout	650±15			
Reset (Auto)	420±25			
Cutout (kPA)				
Reset (Auto) (kPa)				
LOSS–OF–CHARGE/LOW–PRESSURE SWITCH				
(Liquid Line) (psig) Cutout	20±5			
Reset (Auto)	45±10			
Cutout (kPA)				
Reset (Auto) (kPa)	20±5			
	45±10			
RETURN–AIR FILTERS*†				
throwaway (in.)	20x20x1	20x20x1	24x24x1	24x30x1
(mm)	508x508x25	508x508x25	610x610x25	610x762x25

*Required filter sizes shown are based on the larger of the AHRI (Air Conditioning, Heating and Refrigeration Institute) rated cooling airflow or the heating airflow velocity of 300 ft/minute for throwaway type or 450 ft/minute for high–capacity type. Air filter pressure drop for non–standard filters must not exceed 0.08 IN. W.C.

† If using accessory filter rack refer to the filter rack installation instructions for correct filter size and quantity.

Step 7 — Install Electrical Connections

CAUTION

UNIT COMPONENT DAMAGE HAZARD

Failure to follow this caution may result in damage to the unit being installed.

1. Make all electrical connections in accordance with NEC NFPA 70 (latest edition) and local electrical codes governing such wiring. In Canada, all electrical connections must be in accordance with CSA standard C22.1 Canadian Electrical Code Part 1 and applicable local codes. Refer to unit wiring diagram.
2. Use only copper conductor for connections between field-supplied electrical disconnect switch and unit. DO NOT USE ALUMINUM WIRE.
3. Be sure that high-voltage power to unit is within operating voltage range indicated on unit rating plate. On 3-phase units, ensure phases are balanced within 2 percent. Consult local power company for correction of improper voltage and/or phase imbalance.
4. Do not damage internal components when drilling through any panel to mount electrical hardware, conduit, etc.

WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

The unit cabinet must have an uninterrupted, unbroken electrical ground. This ground may consist of an electrical wire connected to the unit ground screw in the control compartment, or conduit approved for electrical ground when installed in accordance with NEC,NFPA 70 National Fire Protection Association (latest edition) (in Canada, Canadian Electrical Code CSA C22.1) and local electrical codes.

High-Voltage Connections

The unit must have a separate electrical service with a field-supplied, waterproof disconnect switch mounted at, or within sight from the unit. Refer to the unit rating plate, NEC and local codes for maximum fuse/circuit breaker size and minimum circuit amps (ampacity) for wire sizing.

The field-supplied disconnect may be mounted on the unit over the high-voltage inlet hole when the standard power and low-voltage entry points are used. See Fig. 3 and 4 for acceptable location. Remove high voltage knockout.

See unit wiring label (Fig. 12) and Fig. 10 for reference when making high voltage connections. Proceed as follows to complete the high-voltage connections to the unit.

1. Run the high-voltage (L1, L2, L3) and ground lead into the control box.
2. Connect ground lead to chassis ground connection.
3. Locate the black, yellow and blue wires connected to the line side of the terminal block.
4. Connect field L1 to black wire.
5. Connect field wire L2 to yellow wire.
6. Connect field wire L3 to blue wire.

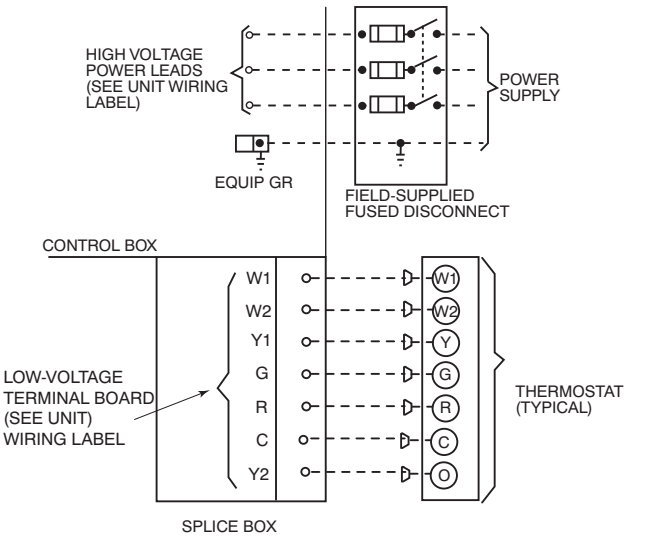


Fig. 10 - High- and Control-Voltage Connections

Control Voltage Connections

NOTE: Do not use any type of power-stealing thermostat. Unit control problems may result.

Use no. 18 American Wire Gage (AWG) color-coded, insulated (35°C minimum) wires to make the control voltage connections between the thermostat and the unit. If the thermostat is located more than 100 ft (30.5 m) from the unit (as measured along the control voltage wires), use no. 16 AWG color-coded, insulated (35° C minimum) wires.

Standard Connections

Locate the low voltage terminal board in 24 volt splice box. See Fig. 10 for connection diagram. Run the low-voltage leads from the thermostat, through the control wiring inlet hole grommet (Fig. 3 and 4), and into the low-voltage splice box. Provide a drip loop before running wires through panel. Secure and strain relief all wires so that they do not interfere with operation of unit.

If an accessory electric heater is installed, low voltage leads from heater must be connected to low voltage terminal board W1 and C terminals.

Transformer Protection

The transformer is protected by a 24 volt circuit breaker. If an overload or short is present, correct overload condition and reset 24 volt circuit breaker.

Special Procedures for 420-v Operation

WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.
Before installing or servicing system, always turn off main power to system and install lockout tag.

The transformer in the unit has two taps, 380 and 415 volts. For power supplies above 400 volts, the transformer must be connected to the 415 volt tap. With power off, disconnect blue wire from transformer splice connection and connect black wire from transformer to splice connection. Insulate unused blue transformer tap. See transformer label. During unit start-up, check secondary voltage to ensure that a minimum of 20 volts is available during unit operation, and that voltage does not exceed 29 volts while unit is off.

Accessory Electric Heaters Installation

Electric heaters may be installed with the 50JZ-A units per instructions supplied with electric heater package. See unit rating plate for factory-approved electric heater kits.

Sequence of Operation

a. CONTINUOUS FAN
   (1.) Thermostat closes circuit R to G energizing the blower motor for continuous fan.

b. COOLING MODE
   (1.) If indoor temperature is above temperature set point, thermostat closes circuits R to G, R to Y1 and R to O (Y2). The compressor, indoor and outdoor fans, and reversing valve are energized.

c. ELECTRIC HEATING MODE
   (1.) Thermostat closes circuit R to W/W1, or W2 and R to G. There are no on or off delays.

d. HEAT PUMP HEATING MODE
   (1.) Thermostat closes circuits R to G and R to Y1. The compressor, indoor and outdoor fans are energized.

e. HEAT PUMP HEATING WITH AUXILIARY ELECTRIC HEAT
   (1.) Thermostat closes circuits R to G, R to Y1 and R to W/W1 or W2. The compressor, indoor and outdoor fans are energized, as well as the electric heat relays.

f. DEFROST MODE
   The defrost mode is automatically energized by the defrost board during heating mode. The defrost board energizes "O" (reversing valve) and "W2" (electric heat). It also de-energizes the outdoor fan. When defrost is complete, unit will return to heating mode. If room thermostat is satisfied during defrost, unit will shut down and restart in defrost on next call for heat.

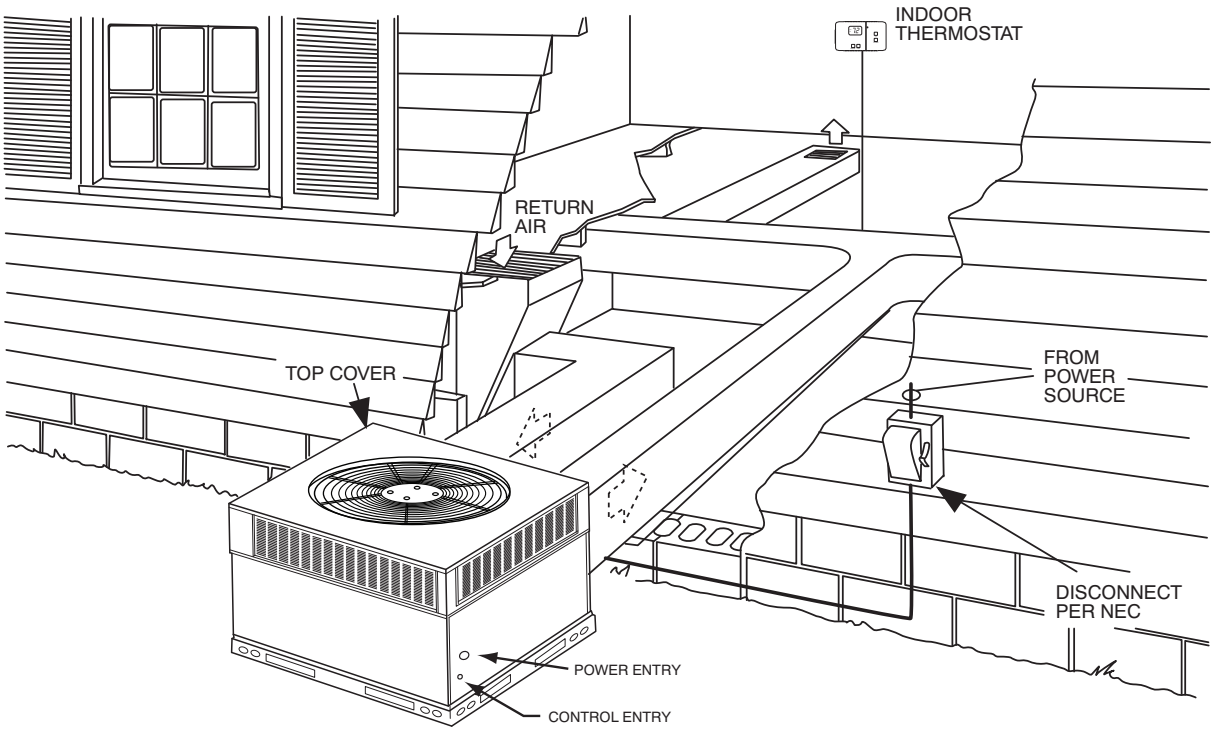


Fig. 11 - Typical Installation

Table 2 – Minimum Airflow for Reliable Electric Heater Operation (CFM)

SIZE	50JZ-A24	50JZ-A30	50JZ-A36	50JZ-A48
AIRFLOW (CFM)	800	1000	1200	1600
AIRFLOW (L/s)	378	472	567	756

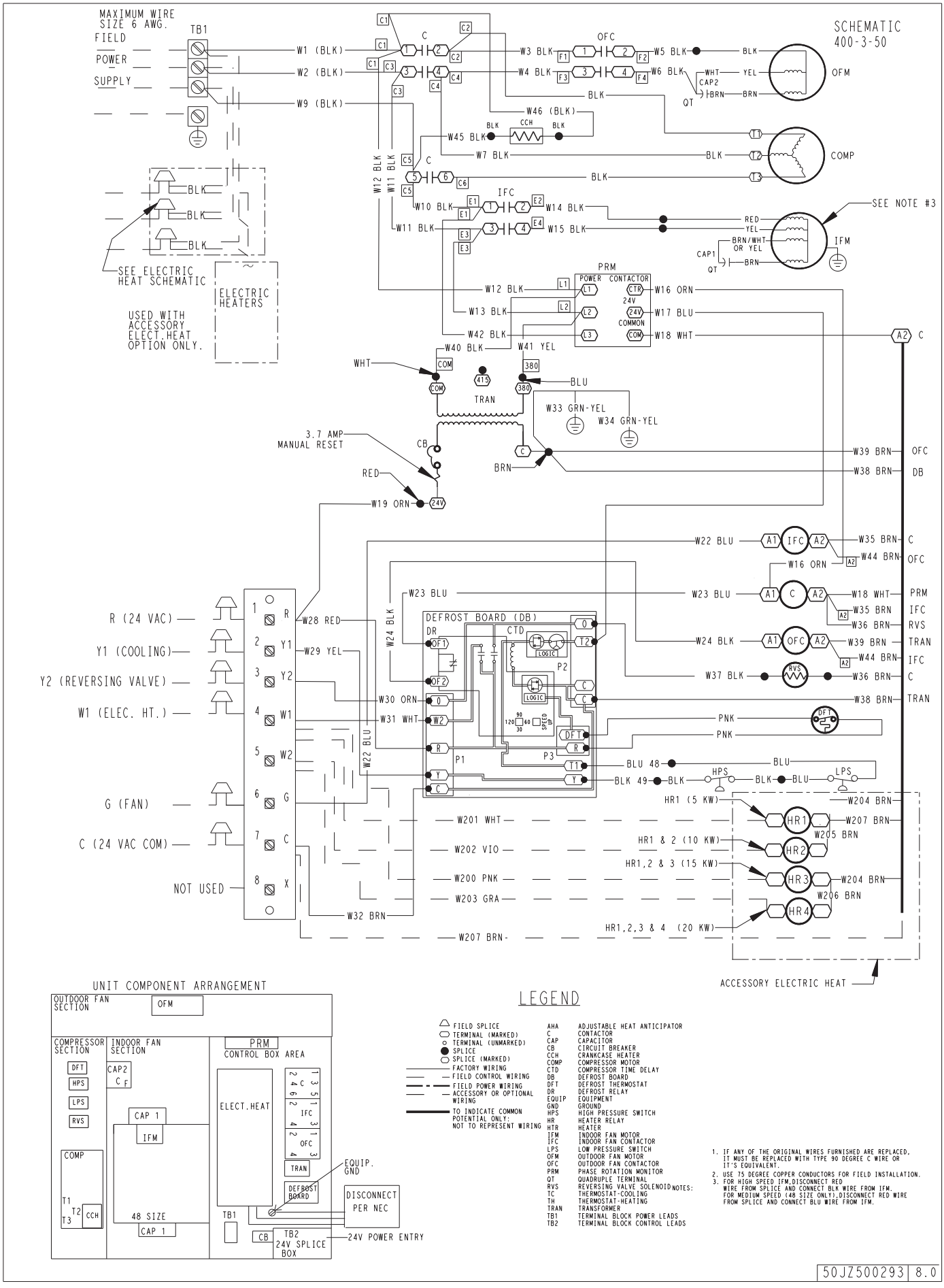
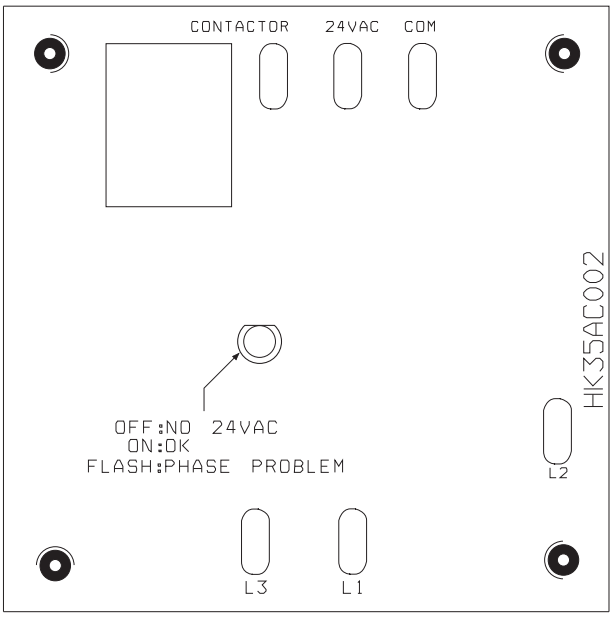


Fig. 12 - Wiring Schematics 400-3-50



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LED	STATUS
OFF	No call for compressor operation
FLASHING	Reversed phase
ON	Normal

Fig. 13 - Phase Monitor Control and LED Indicators

PRE-START-UP

⚠ WARNING

FIRE, EXPLOSION, ELECTRICAL AND ENVIRONMENTAL SHOCK HAZARD

Failure to follow this warning could result in personal injury, death or property damage.

1. Follow recognized safety practices and wear protective goggles when checking or servicing refrigerant system.
2. Relieve and recover all refrigerant from system before touching or disturbing compressor plug if refrigerant leak is suspected around compressor terminals.
3. Do not remove compressor plug until all electrical sources are disconnected and tagged.
4. Never attempt to repair soldered connection while refrigerant system is under pressure.
5. Do not use torch to remove any component. System contains oil and refrigerant under pressure.
   To remove a component, wear protective goggles and proceed as follows:
   a. Shut off electrical power to unit and install lockout tag.
   b. Relieve and reclaim all refrigerant from system using both high- and low-pressure ports.
   c. Cut component connecting tubing with tubing cutter and remove component from unit.
   d. Carefully unsweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.

Use the Start-Up Checklist supplied at the end of this book and proceed as follows to inspect and prepare the unit for initial start-up:

1. Remove all access panels (see Fig. 18).
2. Read and follow instructions on all DANGER, WARNING, CAUTION, and INFORMATION labels attached to, or shipped with, unit.
3. Make the following inspections:
   a. Inspect for shipping and handling damages such as broken lines, loose parts, disconnected wires, etc.
   b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak. Leak-test all refrigerant tubing connections using electronic leak detector, or liquid-soap solution. If a refrigerant leak is detected, see following Check for Refrigerant Leaks section.
   c. Inspect all field and factory-wiring connections. Be sure that connections are completed and tight. Ensure wires do not touch refrigerant tubing or sharp sheet metal edges.
   d. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.
4. Verify the following conditions:
   a. Make sure that outdoor-fan blade is correctly positioned in fan orifice.
   b. Make sure that air filter(s) is in place.
   c. Make sure that condensate drain pan and trap are filled with water to ensure proper drainage.
   d. Make sure that all tools and miscellaneous loose parts have been removed.
5. Each unit system has 2 Schrader-type ports, one low-side Schrader fitting located on the suction line, and one high-side Schrader fitting located on the compressor discharge line. Be sure that caps on the ports are tight.

START-UP

Checking Cooling and Heating Control Operation

Start and check the unit for proper control operation as follows:

(1.) Place room thermostat SYSTEM switch or MODE control in OFF position. Observe that blower motor starts when FAN mode is placed in FAN ON position and shuts down when FAN MODE switch is placed in AUTO position.

(2.) Place SYSTEM switch in cool mode. Lower setpoint to call for cooling. Observe that compressor, indoor and outdoor fans start and deliver cooling.

(3.) Place SYSTEM switch or MODE control in HEAT position. Set control above room temperature. Observe that compressor, outdoor fan, and indoor blower motors start. Observe that heating cycle shuts down when control setting is satisfied.

NOTE: Once the compressor has started and then has stopped, it should not be started again until 5 minutes have elapsed. The defrost board has a built-in 5 minute delay between cycles. The 5 minute compressor delay also applies to heat pump heating mode.

Step 1 — Check for Refrigerant Leaks

Proceed as follows to locate and repair a refrigerant leak and to charge the unit:

1. Locate leak and make sure that refrigerant system pressure has been relieved and reclaimed from both high- and low-pressure ports.
2. Repair leak following Refrigerant Service procedures.

NOTE: Install a bi-flow filter drier whenever the system has been opened for repair.

3. Add a small charge of R-410A refrigerant vapor to system and leak-test unit.
4. Recover refrigerant from refrigerant system and evacuate to 500 microns if no additional leaks are not found.

5. Charge unit with Puron (R-410A) refrigerant, using an electronic scale. Refer to unit rating plate for required charge.

Step 2 — Start-Up Adjustments

Complete the required procedures given in the Pre-Start-Up section before starting the unit. Do not jumper any safety devices when operating the unit. Do not operate the unit in Cooling mode when the outdoor temperature is below 40°F (4°C) (unless accessory low-ambient kit is installed).

IMPORTANT: Three-phase, scroll compressors are direction oriented. Unit must be checked to ensure proper compressor 3-phase power lead orientation. If not corrected within 5 minutes, the internal protector will shut off the compressor. The 3-phase power leads to the unit must be reversed to correct rotation. When turning backwards, the difference between compressor suction and discharge pressures may be minimal

Checking and Adjusting Refrigerant Charge

The refrigerant system is fully charged with Puron (R-410A) refrigerant and is tested and factory sealed.

NOTE: Adjustment of the refrigerant charge is not required unless the unit is suspected of not having the proper Puron (R-410A) charge.

A superheat charging chart is attached to the inside of the compressor access panel (see Fig. 18). The chart includes the required suction line temperature at given suction line pressures and outdoor ambient temperatures.

An accurate thermocouple- or thermistor-type thermometer, and a gauge manifold are required when using the superheat charging method for evaluating the unit charge. Do not use mercury or small dial-type thermometers because they are not adequate for this type of measurement.

NOTE: Allow system to operate for a minimum of 15 minutes before checking or adjusting refrigerant charge.

IMPORTANT: When evaluating the refrigerant charge, an indicated adjustment to the specified factory charge must always be very minimal. If a substantial adjustment is indicated, an abnormal condition exists somewhere in the cooling system, such as insufficient airflow across either coil or both coils.

Proceed as follows:

1. Remove cap from low pressure service fitting.
2. Using hoses with valve core depressors, attach low pressure gauge hose to low pressure service fitting.
3. Start the unit in cooling mode and let run until system pressures stabilize.
4. Measure and record the following:
   a. Outdoor ambient-air temperature (°C) db.
   b. Evaporator inlet-air temperature (°C) wb.
   c. Suction-tube temperature (°C) at low-side service fitting.
   d. Suction (low-side) pressure (kPA).
5. Using "Cooling Charging Tables" compare outdoor-air temperature (°C) db with the entering evaporator air temperature (°C) wb to determine desired superheat temperature. (See Fig. 16).

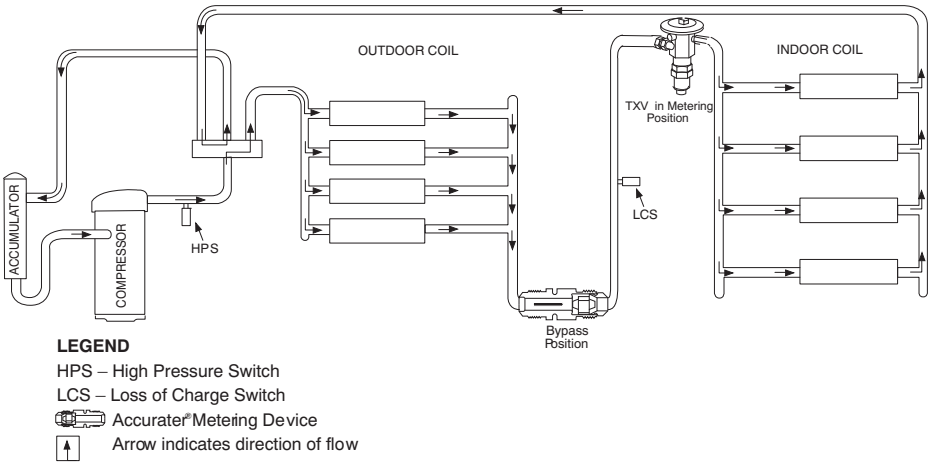

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Fig. 14 - Typical Heat Pump Operation, Cooling Mode

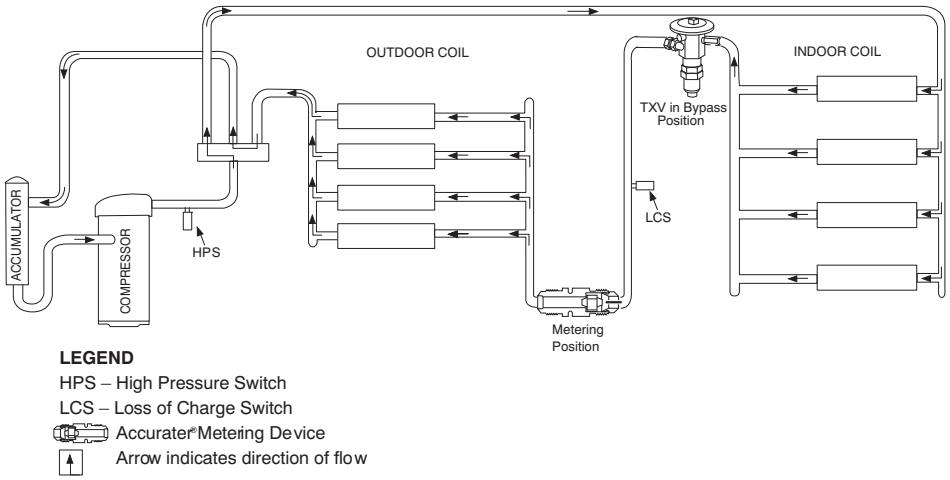

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Fig. 15 - Typical Heat Pump Operation, Heating Mode

6. Using the superheat value in step 5, locate the intersection of the required superheat with the suction pressure previously measured. Note the required suction tube temperature. Using a tolerance of +/- 1.7°C, add refrigerant if actual temperature is higher than charted suction tube temperature, or remove refrigerant if actual temperature is lower than charted suction tube temperature.

NOTE: If the problem causing the inaccurate readings is a refrigerant leak, refer to Check for Refrigerant Leaks section.

Indoor Airflow and Airflow Adjustments

⚠ CAUTION

UNIT OPERATION HAZARD

Failure to follow this caution may result in unit damage.

For heating and cooling operation, the recommended airflow is 350 to 450 cfm for each 12,000 Btuh (165 L/s to 212 for each 3.5 kW) of rated cooling capacity. For units with optional electric heat, the airflow must not be reduced below the levels stated in Table 1.

NOTE: Be sure that all supply-and return-air grilles are open, free from obstructions, and adjusted properly.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Disconnect electrical power to the unit and install lockout tag before changing blower speed.

Table 3 – Color Coding for Indoor Fan Motor Leads

Black = High Speed
Blue = Med Speed (if available)
Red = Low Speed

To change the speed of the indoor fan motor, remove the fan lead from the splice connection. Replace with the desired fan speed lead. Insulate the unused lead to prevent shorting.

SUPERHEAT CHARGING TABLE (SUPERHEAT °C AT LOW-SIDE SERVICE PORT)

OUTDOOR TEMP. (°C)	ENTERING EVAPORATOR AIR °C WB														
	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
13	5.0	6.7	7.8	9.4	11.1	11.9	12.8	14.4	16.1	17.8	19.4	20.6	22.2	23.3	25.0
16	3.9	5.6	6.7	8.3	10.0	10.8	11.7	13.3	15.0	16.7	18.3	20.0	21.1	22.2	23.9
18	-	3.3	5.6	7.2	8.9	9.7	10.6	11.7	13.3	15.0	16.7	18.3	20.0	21.1	22.8
21	-	-	3.9	5.6	7.2	8.1	8.9	10.6	11.7	13.3	15.0	16.7	18.3	20.0	21.7
24	-	-	-	3.3	5.0	5.8	6.7	8.3	10.0	11.7	7.8	15.6	17.2	18.9	20.6
27	-	-	-	-	2.8	3.6	4.4	6.7	8.3	10.0	11.7	13.9	15.6	17.2	19.4
29	-	-	-	-	-	-	-	4.4	6.1	8.3	10.6	12.2	14.4	16.7	18.3
32	-	-	-	-	-	-	-	2.8	5.0	7.2	8.9	11.1	13.3	15.0	17.2
35	-	-	-	-	-	-	-	-	3.3	5.6	7.8	10.0	12.2	13.9	16.1
38	-	-	-	-	-	-	-	-	-	4.4	6.7	8.3	11.1	12.8	15.0
41	-	-	-	-	-	-	-	-	-	2.8	5.0	7.2	9.4	12.2	14.4
43	-	-	-	-	-	-	-	-	-	-	3.3	6.1	8.3	11.1	13.9
46	-	-	-	-	-	-	-	-	-	-	-	4.4	7.8	10.0	12.8

REQUIRED SUCTION TUBE TEMPERATURE °C (MEASURED AT LOW-SIDE SERVICE PORT)

SUPERHEAT TEMP. (°C)	SUCTION PRESSURE AT SERVICE PORT (kPa)								
	743	774	805	836	869	902	957	971	1005
0	1.7	2.8	3.9	5.0	6.1	7.2	8.3	9.4	10.6
1	2.8	3.9	5.0	6.1	7.2	8.3	9.4	10.6	11.7
2	3.9	5.0	6.1	7.2	8.3	9.4	10.6	11.7	12.8
3	5.0	6.1	7.2	8.3	9.4	10.6	11.7	12.8	13.9
4	6.1	7.2	8.3	9.4	10.6	11.7	12.8	13.9	15.0
6	7.2	8.3	9.4	10.6	11.7	12.8	13.9	15.0	16.1
7	8.3	9.4	10.6	11.7	12.8	13.9	15.0	16.1	17.2
8	9.4	10.6	11.7	12.8	13.9	15.0	16.1	17.2	18.3
9	10.6	11.7	12.8	13.9	15.0	16.1	17.2	18.3	19.4
10	11.7	12.8	13.9	15.0	16.1	17.2	18.3	19.4	20.6
11	12.8	13.9	15.0	16.1	17.2	18.3	19.4	20.6	21.7
12	13.9	15.0	16.1	17.2	18.3	19.4	20.6	21.7	22.8
13	15.0	16.1	17.2	18.3	19.4	20.6	21.7	22.8	23.9
14	16.1	17.2	18.3	19.4	20.6	21.7	22.8	23.9	25.0
16	17.2	18.3	19.4	20.6	21.7	22.8	23.9	25.0	26.1
17	18.3	19.4	20.6	21.7	22.8	23.9	25.0	26.1	27.2
18	19.4	20.6	21.7	22.8	23.9	25.0	26.1	27.2	28.3
19	20.6	21.7	22.8	23.9	25.0	26.1	27.2	28.3	29.4
20	21.7	22.8	23.9	25.0	26.1	27.2	28.3	29.4	30.6
21	22.8	23.9	25.0	26.1	27.2	28.3	29.4	30.6	31.7
22	23.9	25.0	26.1	27.2	28.3	29.4	30.6	31.7	32.8

50ES500443 - 2.0

A09336

Fig. 16 - Cooling Charging Table-Superheat

Table 4 – Wet Coil Air Delivery

ENGLISH													
400 VOLT													
UNIT	MOTOR SPEED		EXTERNAL STATIC PRESSURE (IN. W.C)										
			0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
50JZ–A24	Low	Watts	303	305	306	300	–	–	–	–	–	–	–
		Cfm	969	879	785	687	–	–	–	–	–	–	–
	High	Watts	–	–	–	–	435	428	428	422	–	–	–
		Cfm	–	–	–	–	963	833	758	676	–	–	–
50JZ–A30	Low	Watts	–	1002	954	921	889	853	814	–	–	–	–
		Cfm	–	1189	1115	1041	971	903	833	–	–	–	–
	High	Watts	–	–	–	–	–	–	–	700	683	688	755
		Cfm	–	–	–	–	–	–	–	1223	1142	1075	1058
50JZ–A36	Low	Watts	552	540	529	523	514	480	–	–	–	–	–
		Cfm	1296	1237	1167	1097	1029	952	–	–	–	–	–
	High	Watts	–	–	–	–	–	782	765	736	721	780	1002
		Cfm	–	–	–	–	–	1467	1398	1321	1237	1165	1137
50JZ–A48	Low	Watts	692	686	678	664	652	664	736	–	–	–	–
		Cfm	1571	1509	1444	1370	1295	1240	1237	–	–	–	–
	High	Watts	–	–	1112	930	856	834	825	811	793	–	–
		Cfm	–	–	1693	1670	1601	1521	1447	1378	1294	–	–
SI													
400 VOLT													
UNIT	MOTOR SPEED		EXTERNAL STATIC PRESSURE (Pa)										
			0	25	50	75	100	125	150	175	200	225	250
50JZ–A24	Low	Watts	303	305	303	300	–	–	–	–	–	–	–
		L/s	458	415	371	324	–	–	–	–	–	–	–
	High	Watts	–	–	–	–	435	428	428	422	–	–	–
		L/s	–	–	–	–	455	393	358	319	–	–	–
50JZ–A30	Low	Watts	–	1002	954	921	889	853	814	–	–	–	–
		L/s	–	561	526	491	458	426	393	–	–	–	–
	High	Watts	–	–	–	–	–	–	–	700	683	688	755
		L/s	–	–	–	–	–	–	–	577	539	508	499
50JZ–A36	Low	Watts	552	540	529	523	514	480	–	–	–	–	–
		L/s	612	584	551	518	486	449	–	–	–	–	–
	High	Watts	–	–	–	–	–	782	765	736	721	780	1002
		L/s	–	–	–	–	–	693	660	624	584	550	536
50JZ–A48	Low	Watts	692	686	678	664	652	664	736	–	–	–	–
		L/s	741	712	681	647	611	585	584	–	–	–	–
	High	Watts	–	–	1112	930	856	834	825	811	793	–	–
		L/s	–	–	799	788	756	718	683	650	611	–	–

*Air delivery values are based on operating voltage of 400–v, wet coil, without filter or electric heater. Deduct filter and electric heater pressure drops to obtain static pressure available for ducting.

NOTES: 1. Do not operate the unit at a cooling airflow that is less than 350 cfm for each 12,000 Btuh (165 L/s for each 3.5 kW) of rated cooling capacity. Evaporator coil frosting may occur at airflow below this point.

2. Dashes indicate portions of table that are beyond the blower motor capacity or are not recommended.

Table 5 – Filter Pressure Drop (IN. W.C.) (Pa)

FILTER SIZE in.	CFM																			
	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
20X20X1	0.05	0.07	0.08	0.10	0.12	0.13	0.14	0.15	—	—	—	—	—	—	—	—	—	—	—
20X24X1	—	—	—	–	0.09	0.10	0.11	0.13	0.14	0.15	0.16	—	—	—	—	—	—	—	—
24X30X1	—	—	—	–	–	–	–	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18
FILTER SIZE mm	L/s																		
	236	283	330	378	425	472	519	566	614	661	707	755	802	850	896	944	991	1038	1085
508X508X25	12.4	17.4	19.9	24.9	29.9	32.3	34.8	37.3	—	—	—	—	—	—	—	—	—	—	—
508X610x25	—	—	—	–	22.4	24.9	27.4	32.3	34.8	37.4	39.9	—	—	—	—	—	—	—	—
610X762x25	—	—	—	–	–	–	–	17.4	19.9	22.4	24.9	27.4	29.9	32.3	34.8	37.3	39.8	42.3	44.6

Table 6 – Accessory Electric Heat Pressure Drop IN. W.C. (Pa)

HEATER kW	CFM								
	600	800	1000	1200	1400	1600	1800	2000	2200
6.5–17.4	0.030	0.033	0.037	0.042	0.047	0.052	0.060	0.067	0.075
	L/s								
	283	378	472	569	661	755	850	944	1038
	7.5	8.2	9.2	10.4	11.7	12.9	14.9	16.7	18.7

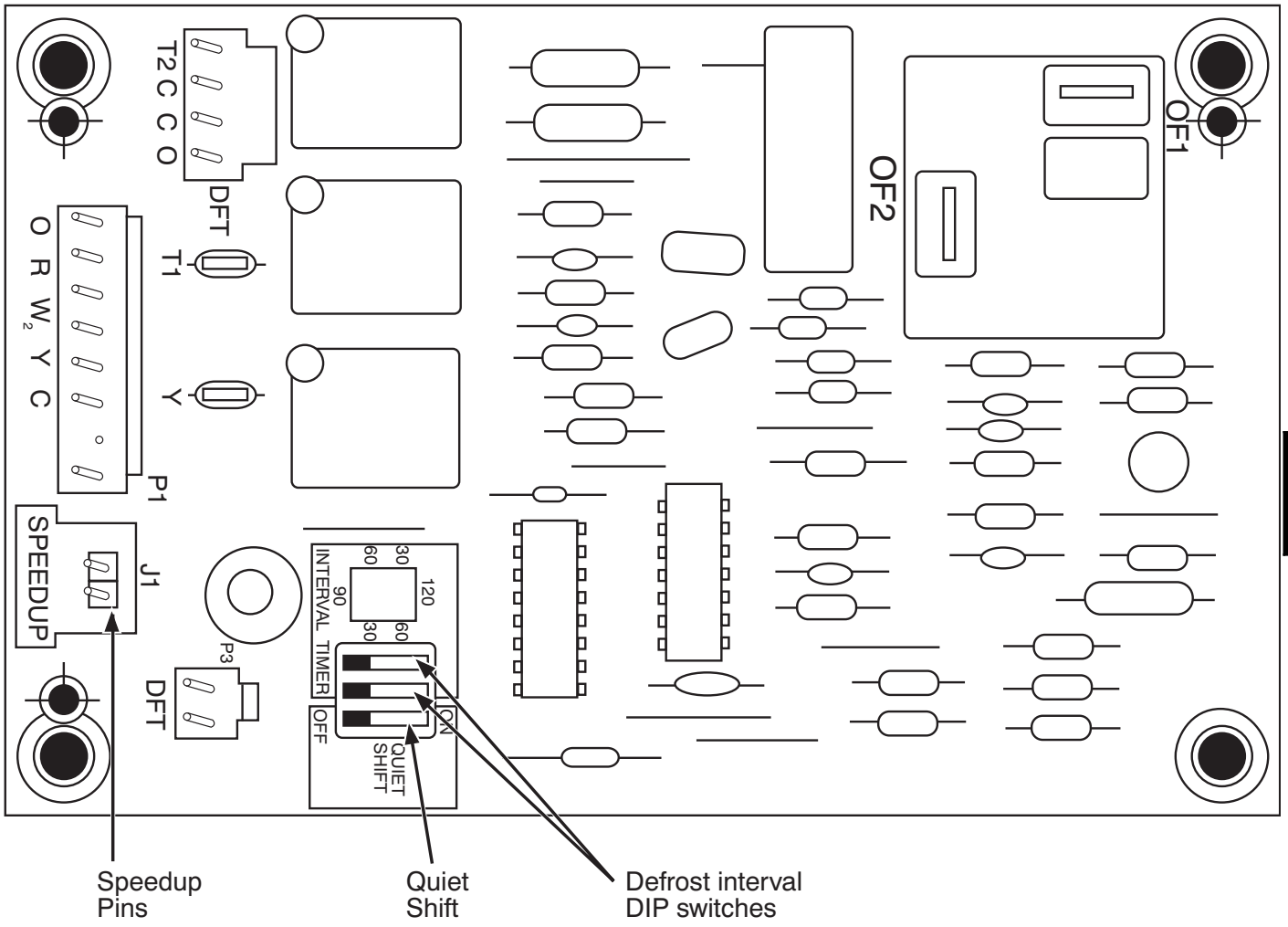

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Fig. 17 - Defrost Control

Step 3 — Defrost Control

Quiet Shift

Quiet Shift is a field-selectable defrost mode, which will eliminate occasional noise that could be heard at the start of defrost cycle and restarting of heating cycle. It is selected by placing DIP switch 3 (on defrost board) in ON position.

When Quiet Shift switch is placed in ON position, and a defrost is initiated, the following sequence of operation will occur. Reversing valve will energize, outdoor fan will turn off, compressor will turn off for 30 sec and then turn back on to complete defrost. At the start of heating after conclusion of defrost reversing valve will de-energize, compressor will turn off for another 30 sec, and the outdoor fan will stay off for 40 sec, before starting in the Heating mode.

Defrost

The defrost control is a time/temperature control which includes a field-selectable time period (DIP switch 1 and 2 on the board) between defrost cycles of 30, 60, 90, or 120 minutes (factory set at 60 minutes). To initiate a forced defrost, two options are available depending on the status of the defrost thermostat.

If defrost thermostat is closed, speed-up pins (J1) must be shorted by placing a flat head screw driver in between for 5 sec and releasing, to observe a complete defrost cycle. When the Quiet Shift switch is selected, compressor will be turned off for two 30 sec intervals during this complete defrost cycle, as explained previously. When Quiet Shift switch is in factory default OFF position, a normal and complete defrost cycle will be observed.

If defrost thermostat is in open position, and speedup pins are shorted (with a flat head screw driver) for 5 sec and released, a short defrost cycle will be observed (actual length is dependent upon the selected Quiet Shift position). When Quiet Shift switch is in ON position, the length of defrost is 1 minute (30 sec compressor off period followed by 30 sec of defrost with compressor operation). On return to heating operation, compressor will again turn off for an additional 30 sec and the outdoor fan for 40 sec. When the Quiet Shift is in OFF position, only a brief 30 sec. cycle will be observed.

NOTE: Unit will remain in defrost until defrost thermostat reopens at approximately 65°F +/- 5°F (18°C +/- 2.8°C) coil temperature at liquid line or remainder of defrost cycle time.

MAINTENANCE

To ensure continuing high performance, and to minimize the possibility of premature equipment failure, periodic maintenance must be performed on this equipment. This heat pump unit should be inspected at least once each year by a qualified service person. To troubleshoot unit, refer to Table 7.

NOTE: TO EQUIPMENT OWNER: Consult your local dealer about the availability of a maintenance contract.

⚠ WARNING

PERSONAL INJURY AND UNIT DAMAGE HAZARD

Failure to follow this warning could result in personal injury or death and unit component damage.

The ability to properly perform maintenance on this equipment requires certain expertise, mechanical skills, tools and equipment. If you do not possess these, do not attempt to perform any maintenance on this equipment, other than those procedures recommended in the Owner's Manual.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow these warnings could result in personal injury or death:

1. Turn off electrical power to the unit and install a lockout tag before performing any maintenance or service on this unit.
2. Use extreme caution when removing panels and parts.
3. Never place anything combustible either on or in contact with the unit.

⚠ CAUTION

UNIT OPERATION HAZARD

Failure to follow this caution may result in improper operation.

Errors made when reconnecting wires may cause improper and dangerous operation. Label all wires prior to disconnecting when servicing.

The minimum maintenance requirements for this equipment are as follows:

1. Inspect air filter(s) each month. Clean or replace when necessary.
2. Inspect indoor coil, drain pan, and condensate drain each cooling season for cleanliness. Clean when necessary.
3. Inspect blower motor and wheel for cleanliness each cooling season. Clean when necessary.
4. Check electrical connections for tightness and controls for proper operation each cooling season. Service when necessary.

Step 1 — Air Filter

IMPORTANT: Never operate the unit without a suitable air filter in the return-air duct system. Always replace the filter with the same dimensional size and type as originally installed. See Table 1 for recommended filter sizes.

Inspect air filter(s) at least once each month and replace (throwaway-type) or clean (cleanable-type) at least twice during each cooling season and twice during the heating season, or whenever the filter becomes clogged with dust and lint.

Indoor Blower and Motor

NOTE: All motors are pre-lubricated. Do not attempt to lubricate these motors.

For longer life, operating economy, and continuing efficiency, clean accumulated dirt and grease from the blower wheel and motor annually.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Disconnect and tag electrical power to the unit before cleaning the blower motor and wheel.

To clean the blower motor and wheel:

1. Remove and disassemble blower assembly as follows:
   a. Remove blower access panel (see Fig 18).
   b. Disconnect indoor blower motor. Remove capacitor if required.
   c. On all units remove blower assembly from unit. Remove screws securing blower to blower partition and slide assembly out. Be careful not to tear insulation in blower compartment.
   d. Ensure proper reassembly by marking blower wheel and motor in relation to blower housing before disassembly.
   e. Loosen setscrew(s) that secures wheel to motor shaft, remove screws that secure motor mount brackets to housing, and slide motor and motor mount out of housing.
2. Remove and clean blower wheel as follows:
   a. Ensure proper reassembly by marking wheel orientation.
   b. Lift wheel from housing. When handling and/or cleaning blower wheel, be sure not to disturb balance weights (clips) on blower wheel vanes.
   c. Remove caked-on dirt from wheel and housing with a brush. Remove lint and/or dirt accumulations from wheel and housing with vacuum cleaner, using soft brush attachment. Remove grease and oil with mild solvent.
   d. Reassemble wheel into housing.
   e. Reassemble motor into housing. Be sure setscrews are tightened on motor shaft flats and not on round part of shaft. Reinstall blower into unit. Reinstall capacitor.
   f. Reconnect blower motor wiring.
   g. Reinstall blower access panel (see Fig. 18).
3. Restore electrical power to unit. Start unit and check for proper blower rotation and motor speeds during cooling cycles.

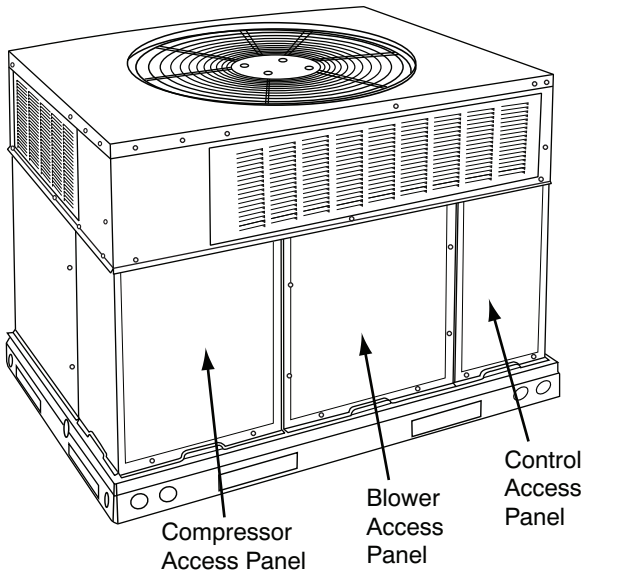

Fig. 18 - Unit Access Panels

Step 2 — Outdoor Coil, Indoor Coil, and Condensate Drain Pan

Inspect the condenser coil, evaporator coil, and condensate drain pan at least once each year.

The coils are easily cleaned when dry; therefore, inspect and clean the coils either before or after each cooling season. Remove all obstructions, including weeds and shrubs, that interfere with the airflow through the condenser coil.

Straighten bent fins with a fin comb. If coated with dirt or lint, clean the coils with a vacuum cleaner, using the soft brush attachment. Be careful not to bend the fins. If coated with oil or grease, clean the coils with a mild detergent-and-water solution. Rinse coils with clear water, using a garden hose. Be careful not to splash water on motors, insulation, wiring, or air filter(s). For best results, spray condenser coil fins from inside to outside the unit. On units with an outer and inner condenser coil, be sure to clean between the coils. Be sure to flush all dirt and debris from the unit base.

Inspect the drain pan and condensate drain line when inspecting the coils. Clean the drain pan and condensate drain by removing all foreign matter from the pan. Flush the pan and drain trough with clear water. Do not splash water on the insulation, motor, wiring, or air filter(s). If the drain tube is restricted, clear it with a plumbers snake or similar probe device.

Step 3 — Outdoor Fan

Keep the condenser fan free from all obstructions to ensure proper cooling operation. Never place articles on top of the unit. Damage to unit may result.

1. Remove 6 screws holding outdoor grille and motor to top cover.
2. Turn motor/grille assembly upside down on top cover to expose fan blade.
3. Inspect the fan blades for cracks or bends.
4. If fan needs to be removed, loosen setscrew and slide fan off motor shaft.
5. When replacing fan blade, position blade back to same position as before.
6. Ensure that setscrew engages the flat area on the motor shaft when tightening.
7. Replace grille.

Step 4 — Electrical Controls and Wiring

Inspect and check the electrical controls and wiring annually. Be sure to turn off the electrical power to the unit.

Remove access panels (see Fig. 18) to locate all the electrical controls and wiring. Check all electrical connections for tightness. Tighten all screw connections. If any discolored or burned connections are noticed, disassemble the connection, clean all the parts, restrip the wire end and reassemble the connection properly and securely.

After inspecting the electrical controls and wiring, replace all the panels. Start the unit, and observe at least one complete cooling cycle to ensure proper operation. If discrepancies are observed in operating cycle, or if a suspected malfunction has occurred, check each electrical component with the proper electrical instrumentation. Refer to the unit wiring label when making these checkouts.

Step 5 — Refrigerant Circuit

Inspect all refrigerant tubing connections and the unit base for oil accumulation annually. Detecting oil generally indicates a refrigerant leak.

If oil is detected or if low performance is suspected, leak-test all refrigerant tubing using an electronic leak detector, or liquid-soap solution. If a refrigerant leak is detected, refer to Check for Refrigerant Leaks section.

If no refrigerant leaks are found and low performance is suspected, refer to Checking and Adjusting Refrigerant Charge section.

Step 6 — Indoor Airflow

The heating and/or cooling airflow does not require checking unless improper performance is suspected. If a problem exists, be sure that all supply-air and return-air grilles are open and free from obstructions, and that the air filter is clean. When necessary, refer to Indoor Airflow and Airflow Adjustments section to check the system airflow.

Step 7 — Metering Device - Piston

This unit uses a fixed orifice metering device for both cooling and heating modes.

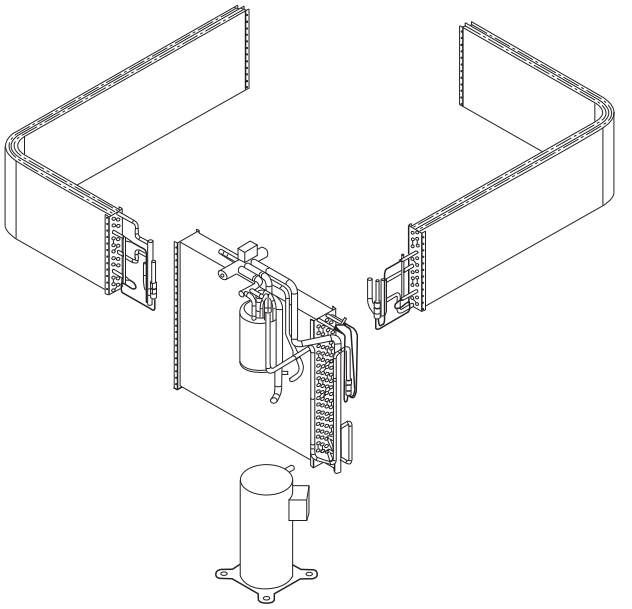

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Fig. 19 - Refrigerant Circuit

Step 8 — Pressure Switches

Pressure switches are protective devices wired into control circuit (low voltage). They shut off compressor if abnormally high or low pressures are present in the refrigeration circuit. These pressure switches are specifically designed to operate with Puron (R-410A) systems. R-22 pressure switches must not be used as replacements for the Puron (R-410A) system.

Step 9 — Loss of Charge Switch

This switch is located on the liquid line and protects against low suction pressures caused by such events as loss of charge, low airflow across indoor coil, dirty filters, etc. It opens on a pressure drop at about 20 psig (138 kPa). If system pressure is above this, switch should be closed. To check switch:

1. Turn off all power to unit.
2. Disconnect leads on switch.
3. Apply ohm meter leads across switch. You should have continuity on a good switch.

NOTE: Because these switches are attached to refrigeration system under pressure, it is not advisable to remove this device for troubleshooting unless you are reasonably certain that a problem exists. If switch must be removed, remove and recover all system charge so that pressure gauges read 0 psi. Never open system without breaking vacuum with dry nitrogen.

Step 10 — High-Pressure Switch

The high-pressure switch is located in the discharge line and protects against excessive condenser coil pressure. It opens at 650 psig (4482 kPa).

High pressure may be caused by a dirty outdoor coil, failed fan motor, or outdoor air recirculation.

To check switch:

1. Turn off all power to unit.
2. Disconnect leads on switch.
3. Apply ohm meter leads across switch. You should have continuity on a good switch.

Step 11 — Copeland Scroll Compressor (Puron Refrigerant)

The compressor used in this product is specifically designed to operate with Puron (R-410A) refrigerant and cannot be interchanged.

⚠ WARNING

EXPLOSION HAZARD

Failure to follow this warning could result in personal injury, death or property damage.

Wear safety glasses and gloves when handling refrigerants. Keep torches and other ignition sources away from refrigerant and oils.

The scroll compressor pumps refrigerant throughout the system by the interaction of a stationary and an orbiting scroll. The scroll compressor has no dynamic suction or discharge valves, and it is more tolerant of stresses caused by debris, liquid slugging, and flooded starts. The compressor is equipped with an internal pressure relief port. The pressure relief port is a safety device, designed to protect against extreme high pressure. The relief port has an operating range between 550 and 625 psig differential pressure (3792 and 4309 kPa).

Step 12 — Refrigerant System

This step covers the refrigerant system of the 50JZ-A, including the compressor oil needed, servicing systems on roofs containing synthetic materials, the filter drier and refrigerant charging.

Refrigerant

⚠ WARNING

PROPERTY HAZARD, PERSONAL INJURY OR ENVIRONMENTAL HAZARD

Failure to follow this warning could result in property damage or personal injury or death.

This system uses Puron (R-410A) refrigerant which has higher operating pressures than R-22 and other refrigerants. No other refrigerant may be used in this system. Gauge set, hoses, and recovery system must be designed to handle Puron. If you are unsure consult the equipment manufacturer.

Compressor Oil

The Copeland scroll compressor uses 3MAF POE oil. If additional oil is needed, use Uniqema RL32-3MAF. If this oil is not available, use Copeland Ultra 32 CC or Mobil Arctic EAL22 CC. This oil is extremely hygroscopic, meaning it absorbs water readily. POE oils can absorb 15 times as much water as other oils designed to HCFC and CFC refrigerants. Take all necessary precautions to avoid exposure of the oil to the atmosphere.

Servicing Systems on Roofs with Synthetic Materials

POE (polyolester) compressor lubricants are known to cause long term damage to some synthetic roofing materials. Exposure, even if immediately cleaned up, may cause embrittlement (leading to cracking) to occur in one year or more. When performing any service that may risk exposure of compressor oil to the roof, take appropriate precautions to protect roofing. Procedures which risk oil leakage include, but are not limited to, compressor replacement, repairing refrigerant leaks, replacing refrigerant components such as filter drier, pressure switch, metering device, coil, accumulator, or reversing valve.

Synthetic Roof Precautionary Procedure

1. Cover extended roof working area with an impermeable polyethylene (plastic) drip cloth or tarp. Cover an approximate 10x10 ft (3x3 m) area.
2. Cover area in front of the unit service panel with a terry cloth shop towel to absorb lubricant spills and prevent run-offs, and protect drop cloth from tears caused by tools or components.
3. Place terry cloth shop towel inside unit immediately under component(s) to be serviced and prevent lubricant run-offs through the louvered openings in the unit base.
4. Perform required service.
5. Remove and dispose of any oil contaminated material per local codes.

Liquid Line Filter Drier

The biflow filter drier is specifically designed to operate with Puron. Use only factory-authorized components. Filter drier must be replaced whenever the refrigerant system is opened. When removing a filter drier, use a tubing cutter to cut the drier from the system. Do not unsweat a filter drier from the system. Heat from unsweating will release moisture and contaminants from drier into system.

Puron (R-410A) Refrigerant Charging

Refer to unit information plate and charging chart. Some R-410A refrigerant cylinders contain a dip tube to allow liquid refrigerant to flow from cylinder in upright position. For cylinders equipped with a dip tube, charge Puron units with cylinder in upright position and a commercial metering device in manifold hose. Charge refrigerant into suction-line.

Step 13 — System Information

Loss of Charge Switch

The loss of charge switch is a protective device wired into control circuit (low voltage). It shuts off the compressor if abnormally low pressures are present in the refrigeration circuit.

NOTE: Because these switches are attached to refrigeration system under pressure, it is not advisable to remove this device for troubleshooting unless you are reasonably certain that a problem exists. If switch must be removed, remove and recover all system charge so that pressure gauges read zero gauge. Never open system without breaking vacuum with dry nitrogen.

Check Defrost Thermostat

The defrost thermostat is usually located on the lowest liquid leaving circuit of the left condenser coil (see Fig. 20). The thermostat closes at 32°F +/- 3°F (0°C +/- 1.7°C) and opens at 65°F +/- 5°F (18°C +/- 2.8°C).

The defrost thermostat signals heat pump that conditions are right for defrost or that conditions have changed to terminate defrost. It is a thermally actuated switch clamped to outdoor coil to sense its temperature.

NOTE: The defrost thermostat must be located on the liquid side of the outdoor coil on the bottom circuit and as close to the coil as possible.

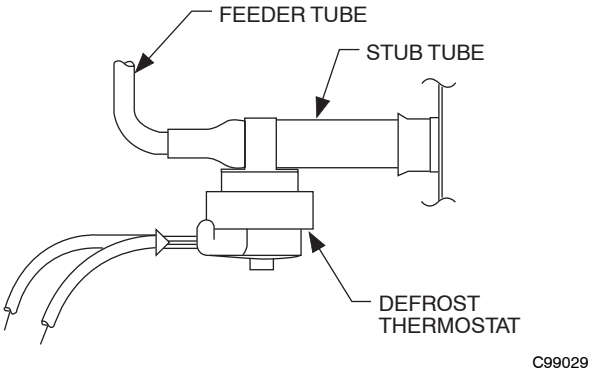

Fig. 20 – Defrost Thermostat

TROUBLESHOOTING

Refer to the Cooling and Heating Troubleshooting Chart (Table 7) for troubleshooting information.

START-UP CHECKLIST

Use the Start-Up Checklist.

PURON® (R-410A) QUICK REFERENCE GUIDE

- Puron refrigerant operates at 50–70 percent higher pressures than R–22. Be sure that servicing equipment and replacement components are designed to operate with Puron
- Puron refrigerant cylinders are rose colored.
- Recovery cylinder service pressure rating must be 400 psig (2758 kPa), DOT 4BA400 or DOT BW400.
- Puron systems should be charged with liquid refrigerant. Use a commercial type metering device in the manifold hose when charging into suction line with compressor operating
- Manifold sets should be minimum 700 psig (4826 kPa) high side and 180 psig (1241 kPa) low side with 550 psig (3792 kPa) low–side retard.
- Use hoses with minimum 700 psig (4826 kPa) service pressure rating.
- Leak detectors should be designed to detect HFC refrigerant.
- Puron, as with other HFCs, is only compatible with POE oils.
- Vacuum pumps will not remove moisture from oil.
- Do not use liquid–line filter driers with rated working pressures less than 600 psig (4137 kPa).
- Do not leave Puron suction line filter driers in line longer than 72 hours.
- Do not install a suction–line filter drier in liquid line.
- POE oils absorb moisture rapidly. Do not expose oil to atmosphere.
- POE oils may cause damage to certain plastics and roofing materials.
- Wrap all filter driers and service valves with wet cloth when brazing.
- A factory approved liquid–line filter drier is required on every unit.
- Never open system to atmosphere while it is under a vacuum.
- When system must be opened for service, recover refrigerant, evacuate then break vacuum with dry nitrogen and replace filter driers. Evacuate to 500 microns prior to recharging.
- Do not vent Puron into the atmosphere.
- Observe all **warnings**, **cautions**, and **bold** text.

Table 7 – Troubleshooting Chart

SYMPTOM	CAUSE	REMEDY
Compressor and condenser fan will not start.	Power failure	Call power company
	Fuse blown or circuit breaker tripped	Replace fuse or reset circuit breaker
	Defective contactor, transformer, or high-pressure, loss-of-charge or low-pressure switch	Replace component
	Insufficient line voltage	Determine cause and correct
	Incorrect or faulty wiring	Check wiring diagram and rewire correctly
	Thermostat setting too high	Lower thermostat setting below room temperature
Compressor will not start but condenser fan runs	Faulty wiring or loose connections in compressor circuit	Check wiring and repair or replace
	Compressor motor burned out, seized, or internal overload open	Determine cause Replace compressor
	Defective run/start capacitor, overload, start relay	Determine cause and replace
	One leg of 3-phase power dead	Replace fuse or reset circuit breaker Determine cause
Three-phase scroll compressor makes excessive noise, and there may be a low pressure differential.	Scroll compressor is rotating in the wrong direction	Correct the direction of rotation by reversing the 3-phase power leads to the unit.
Compressor cycles (other than normally satisfying thermostat).	Refrigerant overcharge or undercharge	Recover refrigerant, evacuate system, and recharge to capacities shown on rating plate
	Defective compressor	Replace and determine cause
	Insufficient line voltage	Determine cause and correct
	Blocked condenser	Determine cause and correct
	Defective run/start capacitor, overload or start relay	Determine cause and replace
	Defective thermostat	Replace thermostat
	Faulty condenser-fan motor or capacitor	Replace
	Restriction in refrigerant system	Locate restriction and remove
Compressor operates continuously	Dirty air filter	Replace filter
	Unit undersized for load	Decrease load or increase unit size
	Thermostat set too low	Reset thermostat
	Low refrigerant charge	Locate leak, repair, and recharge
	Mechanical damage in compressor	Replace compressor
	Air in system	Recover refrigerant, evacuate system, and recharge
	Condenser coil dirty or restricted	Clean coil or remove restriction
Excessive head pressure	Dirty air filter	Replace filter
	Dirty condenser coil	Clean coil
	Refrigerant overcharged	Recover excess refrigerant
	Air in system	Recover refrigerant, evacuate system, and recharge
	Condenser air restricted or air short-cycling	Determine cause and correct
Head pressure too low	Low refrigerant charge	Check for leaks, repair, and recharge.
	Compressor IPR leaking	Replace compressor
	Restriction in liquid tube	Remove restriction
Excessive suction pressure	High heat load	Check for source and eliminate
	Compressor IPR leaking	Replace compressor
	Refrigerant overcharged	Recover excess refrigerant
Suction pressure too low	Dirty air filter	Replace filter
	Low refrigerant charge	Check for leaks, repair and recharge
	Metering device or low side restricted	Remove source of restriction
	Insufficient evaporator airflow	Increase air quantity Check filter–replace if necessary
	Temperature too low in conditioned area	Reset thermostat
	Outdoor ambient below 55°F (12.7°C)	Install low-ambient kit
	Filter drier restricted	Replace filter

START-UP CHECKLIST

(Remove and Store in Job Files)

I. PRELIMINARY INFORMATION

MODEL NO.:_____

SERIAL NO.:_____

DATE:_____

TECHNICIAN:_____

II. PRESTART-UP (Insert check mark in box as each item is completed)

( ) VERIFY THAT ALL PACKING MATERIALS HAVE BEEN REMOVED FROM UNIT

( ) REMOVE ALL SHIPPING HOLD DOWN BOLTS AND BRACKETS PER INSTALLATION INSTRUCTIONS

( ) CHECK ALL ELECTRICAL CONNECTIONS AND TERMINALS FOR TIGHTNESS

( ) CHECK THAT INDOOR (EVAPORATOR) AIR FILTER IS CLEAN AND IN PLACE

( ) VERIFY THAT UNIT INSTALLATION IS LEVEL

( ) CHECK FAN WHEEL, AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE AND SETSCREW TIGHTNESS

III. START-UP

ELECTRICAL

SUPPLY VOLTAGE_____

COMPRESSOR AMPS_____

INDOOR (EVAPORATOR) FAN AMPS_____

TEMPERATURES

OUTDOOR (CONDENSER) AIR TEMPERATURE_____DB

RETURN-AIR TEMPERATURE_____DB_____WB

COOLING SUPPLY AIR_____DB_____WB

HEAT PUMP SUPPLY AIR _____

ELECTRIC HEAT SUPPLY AIR _____

PRESSURES

REFRIGERANT SUCTION_____PSIG, SUCTION LINE TEMP*_____

REFRIGERANT DISCHARGE_____PSIG, LIQUID TEMP†_____

( ) VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS

* Measured at suction inlet to compressor

† Measured at liquid line leaving condenser.

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